The decline of infant mortality, 1871-1911: a medical conundrum ; the case of Nuneaton (Warwickshire) in the late nineteenth and early twentieth centuries.

Thesis

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The decline of infant mortality 1871 - 1911: a medical conundrum. The case of Nuneaton (Warwickshire) in the late nineteenth and early twentieth centuries.

'To what extent could parents be considered responsible for the deaths of their infants in the Nuneaton Union between 1871 and 1911 as suggested by the Medical Officer of Health for that period, and could changes undertaken by them account for the decline in the infant mortality rate?'

by

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`The decline in infant mortality 1871 - 1911: a medical conundrum: the case of Nuneaton (Warwickshire)in the late nineteenth and early twentieth centuries.`

This study forms part of a larger research project investigating the causes for the decline in infant mortality in the late nineteenth and early twentieth centuries in localised areas of England. The work of this study looks at Nuneaton in Warwickshire, a small town greatly dependent upon the ribbon weaving industry in the early nineteenth century, the decline of which affected the development of an improved standard of living in the town. The later growth of the East Warwickshire coal field, and other industries, resulted in the rapid expansion of the town in the last years of the century. Data gathered from the Vaccination Registers and the Return of Infant Deaths enabled an investigation to be made into the families experiencing multiple infant deaths during the period 1881 to 1891. Details from local studies, Board of Health Minutes and two major reports to the Board allowed the effects of the families` environment to be taken into consideration when assessing the causes of the infant mortality in the Nuneaton Union. These findings were related to the views of the Medical Officer of Health who considered the parents to be responsible for the infant deaths. This study showed that while no one factor could be seen to have caused the decline in infant mortality, improvements in water supplies, sewage disposal, and a gradual improvement in the standard of housing combined with a decrease in fertility were the major factors in the decline in infant mortality in Nuneaton at this period.

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1. Introduction

The picture of infant mortality in England throughout the second half of the nineteenth century is one of apparent stability, at a level of about 150 infant deaths per 1000 live births, with a short term increase during the 1890s, which was then followed by an almost continuous decline after 1900. However, considerable variations to the national figures can be seen over space and time, suggesting that the decline in infant mortality was affected by social and economic factors prevailing at a local level. (Lee, 1991. p.56). A review of current literature presenting the different aspects of the debate on the causes of the decline of infant mortality will be given, and where possible related to the local area covered by this study.

This study will consider the changes which occurred in Nuneaton in Warwickshire, a town which, in the middle of the nineteenth century, experienced the decline of its major industry of ribbon weaving. In the later years of the nineteenth century the development of the East Warwickshire coal field resulted

in considerable expansion of Nuneaton, although there was no housing built specifically for the mining community. Within the Nuneaton Union the deficiencies of both the water supply and the sewage system, recognised as major issues in the middle of the century, continued to offer many of the inhabitants an inferior standard of public health well into the twentieth century.

The infant mortality rate for the Nuneaton Union between 1871 and 1910 can be seen to fluctuate between 157 in 1871, peaking at 192 in the late 1890s and dropping to 100 in 1910. On a five year moving average the IMR of Nuneaton closely follows the national trend of a gradual decline from that of 1871 with the exception of a sharp rise in the last years of the century, before returning to the downward trend. The reasons for this decline may be various and their impact may be considered individually or in combination. However, it will be shown that in a comparison of Infant Deaths per Quarter, given as a percentage of Infant Deaths per Year, the national trend was for the higher percentage of infant deaths to occur in the third quarter,whereas in Nuneaton the higher percentage was usually to be found in the first quarter of the year during the 1870s and 1880s, and only in the 1890s did the figures for the third quarter follow the national trend. The factors which may have contributed to the situation in the Nuneaton Union will be considered and reasons sought for this variance with national figures.

A detailed case study will be made of families in the Nuneaton Union between 1881 and 1891 who experienced the death of more than one infant, and consideration given to the possible causes. A conclusion will be drawn as to whether one particular issue can be considered to have been the predominant

factor in the decline of infant mortality in Nuneaton, and if so whether the parents of the infants could be considered to be responsible for the situation, as suggested by the Medical Officer of Health.

2 Infant Mortality 1871- 1910 : A Literature Search

Although throughout the second half of the nineteenth century infant mortality in England and Wales remained at approximately 150 deaths per 1000 live births, it has been suggested (Dyehouse, 1978. p. 248) that this rate had attracted little attention while general death rates remained high. Between the 1860s and 1900 the GDR fell by about 15 % and the death rate of children aged 1 to 5 fell by 33%, emphasising the high infant mortality rate. At the same time the birth rate had declined steadily from 35.5 in 1871 - 1875 to 29.3 in 1896 - 1900 and the combination of these factors gave rise to concern over a declining population. It is noticeable that, nationally, the decline in infant mortality appears to have occurred over thirty years later than the decline in early childhood mortality had begun and that it fell after, rather than before, the decline in marital fertility. In his paper on regional inequalities in infant mortality, Lee (1991. p.56) raised doubts that the decline was consistent as suggested by Woods et al (1988.p.349). Lee calculated infant mortality rates between 1861 and 1971 on a county basis and found that the regional IMR did not fall uniformly. In some areas the highest rate was recorded in 1861, followed by a continuous improvement , whereas in others the peak occurred in 1871. Lee found that in 40 of the 55 regions the highest infant mortality was registered in 1861 and 1871, accounting for 80% of the national population.

Woods, Watterson and Woodward (1988.p. 354) stressed the necessity for a distinction to be made between the `low mortality` rural areas and `high mortality` urban areas as, during the second half of the nineteenth century, the redistribution of the population from rural to urban areas resulted in a few large cities contributing a disproportionate share of all infant deaths in England and Wales. They suggest that infant mortality remained high until 1900 as a result of the hot summers of the 1890s, which, combined with the poor sanitary conditions in the larger towns, created an increase in the spread of diarrhoeal diseases. The rapid increase in infant mortality in cities such as London, Liverpool and Birmingham caused the national levels to rise, resulting in a delay in the onset of national infant mortality decline and emphasising the decline after 1900. Figures taken from the Annual Reports and Quarterly Returns of the Registrar General (Williams and Galley, 1995.p.411) show an increase in IMR in areas of all sizes during the last decade of the nineteenth century but Woods et al suggest that, if the hot summers of the 1890s are considered as exceptional, and are therefore discounted, the national infant mortality decline appears to date from the late 1870s. Although mortality rates in towns and cities were higher than in rural areas, Woods (1985.p.649) has demonstrated that as larger numbers of people moved out of `low risk` rural areas into `high risk` urban environments, exposing a larger proportion of infants to the adverse environment, the national IMR did not show a corresponding increase but remained relatively steady. This indicates that there was in fact a real improvement in the life chances of infants within the urban areas.

Williams and Galley (1995.p.417) suggest a model of influences upon infant health with the infant in the centre surrounded by concentric circles of `mother`,

`home environment` and `public environment`, although no one of these should be seen to be of greater or lesser importance but as varying over time and space. The model stresses the interaction between different factors and how those operating at one level may have counteracted by factors operating at another. Thus a mother breast feeding her infant would offer protection against insanitary conditions although, alternatively, poor child care practices would be prejudicial to infant survival however good the public environment. Investment in both the public and the home environments may be seen to have been the most effective method of reducing infant mortality but this involved a cost implication, and strategies aimed at improving the skills and abilities of the mother provided a cheaper alternative.

Williams and Galley`s scheme of the factors influencing levels of infant mortality in the nineteenth century illustrates the principal economic, social, political and environmental influences, which they consider would have varied with the infant`s age. They suggest that concentrating on the national IMR highlights the importance of the political and institutional initiatives, such as health visiting, milk depots and baby clinics as explanatory factors in the decline in infant mortality, and although positive in themselves, Williams and Galley put forward the view that the timing of the decline in the IMR in some communities, prior to such initiatives, supports a case for a connection between fertility decline and that of infant mortality.

Following the Boer War an Interdepartmental Committee on Physical Deterioration was set up in 1903, and listed amongst its recommendations was a need for greater research into the underlying causes of infant mortality and a

survey of fertility among the different social classes. As a result three special questions were included on the enumeration schedules of the 1911 census. Each married woman was required to declare the duration of her present marriage, the number of living children born to that marriage and the number of these children who had subsequently died. T.H.C.Stevenson, the Statistical Superintendent at the General Register Office was responsible for the analysis of the information collected which was published as a report in 1923. The report examined child mortality by duration of, and age at marriage; the number of children born to the couple; the size of their accommodation; social class and occupation; geographical location and place of birth. However, no indication was given as to when, or at what age, the child had died. Stevenson showed that child mortality increased dramatically with the number of children born to a couple and that mortality varied with the number of rooms inhabited by a family. Stevenson wrote,`It seems probable both that large families promote high mortality, and that high mortality promotes large families; but the separate effects of these influences remain very difficult to measure`. (Garrett and Reid, 1995.p.70)

A sample of anonymous census records from 1911 has enabled further study to be carried out by the Cambridge Group. The records were drawn from 13 registration districts across England and Wales, each being chosen to represent a broad spectrum of late nineteenth and early twentieth century society. Garrett and Reid report that this research indicates that, in the case of infant mortality, the circumstances in which people happened to be living was the most important factor, and class was seen to have some effect, with the children of higher classes being advantaged in terms of health. The analysis showed infants were

more likely to survive where there was greater financial or social security, with the husbands unemployment, the wife in outside employment, and the presence of boarders, all being associated with higher infant and child mortality. Indicators of economic well being, such as larger number of rooms and the presence of servants, were associated with better prospects of child survival, and, where the environment was not conducive to child health, these factors enabled them to preserve the health of their children to a greater extent than the lower classes.

Preston and Hayes (in Garrett and Reid. 1995.p.85) suggest it was the middle classes` greater ability to remove their families to areas of good health which reduced their infant and child mortality levels below that of the general population. Garrett and Reid conclude that a general decline in fertility was seen from 1891 to 1911, but the rate of decline differed from one environment to another, with only a very small decline in the areas which might be considered illustrative of the Nuneaton Union. This would appear to suggest that a decline in fertility might not be considered a reason for the decline in infant mortality in the area covered by this study.

The economist Stanley Jevons, writing in 1882, complained that although articles appeared regularly in learned periodicals on the subject of infant mortality rates in large towns, in general the subject continued to be `far too wide and vague an idea to rivet the attention of the public`. (Dyehouse.1978.p.248). However, the situation changed rapidly in the last decade of the century and between 1900 and 1914 the prevailing infant mortality rate became one of the major social problems of the time. During this period the conviction that a large proportion of the current infant death rate could be prevented grew, arising from

the observation of wide regional and topographical variations in infant mortality rates, with a much higher rate occurring in the towns, particularly in the overcrowded industrial and mining districts of the Midlands and North, than in the countryside. During the first ten years of the twentieth century various medical, sanitary and statistical experts undertook a series of investigations and publications on the subject and in 1906 the first National Conference on Infant Mortality was held and the second two years later.

In a study of Infant Welfare in Edwardian England, Lewis (1980.p.465) states that the largest single cause of infant mortality before 1911 was diarrhoeal infections although a larger proportion of deaths were recorded as being due to developmental and wasting diseases. These were largely ignored because it was commonly believed that deaths in the first month were due more to inherited weakness than anything else and therefore that mortality in the first month was a form of natural selection. As a result health officials concentrated upon trying to prevent outbreaks of infantile diarrhoea and concluded that this could only be achieved by better infant hygiene. It had been shown that breast fed babies were less prone to diarrhoea than bottle-fed ones, in 1905 the MOB for Derby calculated the death rate of breast fed babies to be 69 per 1,000 and that of bottle fed babies 197.5 per 1,000. This was supported by evidence from Croydon and Salford during 1907 - 9 and led to attention being focused on the mother. In 1913 Newman wrote that the problem of infant mortality was `mainly a question of motherhood and ignorance of infant care and management` and gave rise to the general belief that infant mortality was due more to people themselves rather than to their external surroundings. This view was reinforced by Pearson, Professor of Eugenics at University College London, in his

Chadwick Lecture of 1913, where he purported to show that maternal habits were more important than any other variable in the issue of infant mortality. Most MOHs concurred with Pearson`s opinion, differing only in their belief that these habits were susceptible to change, despite the fact that in 1910,Sir Arthur Newsholme, the Medical Officer of the Local Government Board had admitted that infant mortality was highest amongst urban working-class people, who had the worst sanitation, infrequent medical attention and the most contaminated milk.

The Registrar General`s report for 1911 clearly showed the mortality rate of working class infants was greater than that of middle class infants although Lewis (1980. p.471) cites evidence suggesting that working class mothers were more likely to breast feed their infants, an estimated four fifths in 1910 and six sevenths in Warwickshire in 1915. Newsholme, in his third report, taking his figures from Brighton and Derby, claimed that approximately 80% of mothers in wage earning populations breast fed their infants either wholly or partly, while a much smaller proportion of mothers from well to do classes did so. It has been suggested (Woods, Watterson and Woodward 1989. p.117) that although not universal, the practice of breast feeding infants, especially the very young, seems to have been usual in urban England. This is taken to endorse Newsholme`s view that breast feeding among working class mothers helped to reduce infant mortality, where poverty, environment and poor sanitation could have caused a higher IMR. When working-class women did not breast feed it was often due to poor nutrition and an inability to do so, and Dr. Ethel Bentham, a leading member of the Women`s Labour League, felt that better feeding of mothers was the key to successful breast feeding. Dr. Amand Routh, a member

of the National Association for the Prevention of Infant Mortality, admitted that the poor nutrition of mothers was a factor which determined methods of infant feeding, but he still felt ignorance was more important. Pearson`s studies showed that sickness on the part of the mother was another common cause of bottle feeding, a factor he attributed to hereditary weakness, although women could rarely afford to call the doctor for themselves or their infants (Spring Rice, 1939.p.55). The 1911 Annual Report by the Medical Officer of Health for Nuneaton shows in that year the County Health Visitor, Miss Underwood, undertook 708 visits. Although the number of registered births in Nuneaton in 1912 was 1155 the number of visits recorded by her is given as only 213 (Lane.pp 71-2). However, of the 213 visits made in 1912 only 85 were to infants, only 49 of whom were being totally breast fed, 2 partly so and 6 artificially. There is no record of the feeding methods of the others visited and only one infant is recorded as being improperly fed. She recorded no child as being neglected.

Consideration as to the causes of infant mortality variations had been given as early as 1863 by Sir John Simon, the Medical Officer of the Privy Council. (Woods, Watterson and Woodward, 1989.p.113) He suggested two main factors, firstly differences in the degree of common sanitary defects of residences and secondly the variation in occupation amongst the inhabitants, especially in the large towns where there was a high level of employment amongst married women, the consequences of which, Sir John considered, were ill kept homes and neglected and ill-fed children. In 1905 Dr. John Tatham of the General Register Office cautioned against anyone attributing the decline in mortality to the results of sanitary legislation and the suggestion that medical and sanitary science was the principal source of improvement in the nation`s health was

conclusively rejected by Professor Thomas McKeown and his associates (Szreter 1988.p.3). Although the public health movement, in the form of municipal sanitation and improved hygiene, were identified by McKeown as positive influences, their importance was considered to be of secondary importance and McKeown showed that many of the major airborne diseases had already declined considerably in England and Wales before the earliest date at which the relevant scientific medical innovations occurred. He claimed that his analysis of Britain`s detailed death records showed that the major factor which established the momentum of declining mortality was a rising standard of living and, predominantly, improved diet, which he considered to be responsible for eliminating approximately half of all deaths.

Szreter (1988.p.34) suggests that, on re-examining the historical evidence, McKeown`s arguments cannot be sustained, and that the theory of the decline of airborne diseases can no longer be considered the predominant characteristic of changing mortality patterns. He states that the increasing incidence of sanitation and hygiene diseases in the first two thirds of the nineteenth century was a direct result of the unplanned growth of overcrowded towns and cities which lacked a proper water supply and basic sanitary facilities and that the reduction of water-borne diseases towards the end of the century was a result of their eventual provision. McKeown acknowledged that the rapid movement from country to towns must have led to a deterioration of hygiene as indicated by the appearance of cholera and that mortality from these infections did not begin to decline until there were improvements in water supplies and sewage disposal.

Sir John Simon considered the second major cause of infant mortality variations

to be related to occupational differences, with particular reference to the employment of mothers outside the home. Throughout the nineteenth century there had been a belief that the employment of mothers outside the home resulted in a high IMR as they would neither be able to make proper provision for the infant`s care and supervision during the day, nor would they be able to breast feed them. Dyehouse (1978.p.251) suggests that this assumption was a result of the middle class Victorian belief that women should stay at home and their definition of married women`s employment outside the home as a social problem. George Reid, Medical Officer of Health for Staffordshire at the Annual Meeting of the British Medical Association in 1892, described the dissimilarities between the IMR of North Staffordshire and that of South Staffordshire over the 1881 - 1889 period. He believed that these discrepancies could only be explained by the varying extent of women`s employment in the two areas, the North, with a high IMR, having plentiful work for women in the potteries, and the South, with a low IMR, offering little work for women, being a predominantly coal-mining and iron-working area (Dyehouse 1978.p.252). The Registrar General believed the 1911 census data to have established the `evil results of maternal employment` with regard to child health and in 1894 H.R. Jones, in his article `The perils and protection of infant life` wrote that `The children of women engaged in industrial occupations suffer from the effects of maternal neglect.`

In 1910 Newsholme, in the first of five reports which were wholly or partly concerned with the infant mortality problem, argued that in cases of extreme poverty the money earned by a working mother may be more likely to reduce infant mortality and was clearly doubtful about the statistical association between the employment of married women and the IMR. His work for his Reports of 1914

and 1915 showed that infant mortality could be high where women`s employment was common, but were becoming less so, and in fact high numbers of women in employment and low IMR continued to be found together. (Woods, Watterson and Woodward, 1989.p.115)

Beaver (1973.p.244) claims that the fall in infant mortality was brought about by improvements in the safety of infant foods combined with the increasing availability and cheapness of cows milk. A British Medical Journal Editorial (1904) on the work of the Inter-Departmental Committee on Physical Deterioration states that :- `At present cow`s milk is too often, when it reaches the houses of the poor, in a state which renders it dangerous to life`.The article went on to say that this being the case the high IMR was not surprising and that the situation would continue until a clean milk supply was ensured. (Dwork, 1987.p.55). Dwork`s study `The Milk Option` illustrates the perceived division at the beginning of the twentieth century between the `non-preventable` and the `preventable` causes of infant deaths. Between 1880 and 1900 there had been a dramatic increase in infant deaths due to diarrhoeal disease, which was found to be primarily a disease of the towns especially in the third quarter of the year. A number of large scale studies showed that factors such as housing and maternal employment were only erratically correlated, the primary determinant of diarrhoea disease in infants was the method of feeding, breast or bottle.

Beaver (1973.p.245) quotes an article by Kretchner in `The Lancet` which suggests that the natural method of feeding for infants is to be breast fed to the age of two or three and then to be weaned on to a non milk diet. Kretchner goes on to say that early weaning without a satisfactory alternative exposes the infant

to a risk of malnutrition and under poor conditions increased possibility of death due to hypothermia and infection. A considerable amount of work was carried out in France in the 1890s, by Budin in Paris and Duffour in Fechamp in Normandy, establishing infant welfare clinics which gave medical supervision for the first two years of an infant`s life and where mothers were encouraged to breast feed as much as possible and if necessary to supplement with good quality sterilised milk. Although establishments based on the French model were opened in England, notably in St.Helens, they did not achieve the same level of success. Breast feeding was not particularly encouraged and attempts to provide medical care for infants were not successful. While in France the charge for sterilised milk was based on the parents ability to pay, the council at St Helens felt it was impossible to follow this and a price was fixed at 2d per days supply, twice the price charged by Duffour. In England the milk depot system failed to reach the infants for whom it had been intended (Dwork, 1987.p.67).

A review published by the Office of Health Economics suggests that the fall in the IMR was as a result of the Midwives Act of 1902 although Beaver (1973.p.243) challenged this on the grounds that the Act could not have resulted in immediate improvement of a service which Beaver felt had not been particularly bad in previous decades. This claim could be supported by the 1912 analysis of causes of deaths in Warwickshire, which shows only 1 death due to puerperal fever and 2 due to `Other accidents and diseases of pregnancy and parturition`(Lane. p.71) Beaver suggested that improved midwifery eventually resulted in a decline in maternal mortality but could not have altered the number of infant deaths which occurred after the first few days of life and that, as ante-natal care was still nonexistent, deaths from prematurity would not have been

affected.

3 Nuneaton

The area of Nuneaton covered by this study is located in north east Warwickshire, and in the years 1871 to 1911 was made up of the Nuneaton Rural District, the Nuneaton Rural District and the Bulkington Urban District. The Nuneaton Union included the parishes of Caldecote, Weddington, Nuneaton, Arley, Ashley, Chilvers Coton and Bulkington with the Nuneaton Sub-district being the only sub-district within the Nuneaton Union.

3.1 Statistical Analysis

A study of infant deaths per quarter as a percentage of infant deaths per year for England shows that the highest percentage occurred in the third quarter throughout the period 1871 to 1910, peaking in 1899 at approximately 38%. This factor is usually accounted for by the incidence of summer diarrhoea, exacerbated by the hot summers in the late 1890s. However, a study of the comparative figures for Nuneaton can be seen to be at variance with the national findings, with the greater percentage of deaths per year occurring in the first quarter on 13 occasions between 1871 and 1894. In 17 out of these 24 years the percentage of infant deaths in Nuneaton in the first quarter exceeded the national figures and on 17 occasions the rate in the third quarter was less than the national figure Only after this date did the percentage infant death rate for Nuneaton increase in the third quarter and follow a similar pattern to the national figures. This would indicate that, whilst it can be seen that there was a seasonal

effect upon infant mortality, this did not necessarily occur in warm weather when inadequate water supplies and drainage systems could be considered the predominant factor, but in exceptionally hot weather as experienced in the late 1890s a seasonal effect was observed in the third quarter of the year.

By taking a five year average of the infant deaths in the first quarter as a percentage of live births it can be seen that there was a gradual decline in infant deaths over the period 1871 to 1910 in Nuneaton with figures reducing from 4.8 % to 2.9%, in comparison the national figures reduce from 3.8% to 3.0% for the same period of time. Over the 40 years being considered by this study it can be seen that the infant mortality rate of the Nuneaton Union became gradually more in line with the national figures.

The graph (Appendix 1,Graph 1) showing the figures for Nuneaton in the first quarter of the year in comparison with the national figures shows that for most of the years 1871 to 1893 the percentage of infants who died in Nuneaton remained considerably higher than the percentage nationally. The exception to this may be observed in the years 1883 to 1887 when the Nuneaton figures show very little variation from the national statistics. From 1894 the percentage of infants dying in Nuneaton in the first quarter of the year dropped, and from that point to 1910 it can be seen that the Nuneaton figure remained consistently lower than that nationally.

The graph (Appendix1, Graph 2) of the fourth quarters figures shows that during the 1880s the figures for this quarter rose, only declining at the end of the decade. If the two winter quarters are taken together it can be seen that

throughout the whole period 1871 to 1893 the figures for Nuneaton remained consistently higher than those of England. The noticeable change occurred in the early 1890s, coinciding with the building era as identified by Milburn (1963). It could therefore be suggested that the improvement in housing in Nuneaton appears to have had some impact on the winter infant mortality rate in the town.

The graph for the second quarter of the year (Appendix 1, Graph 3) illustrates that on a five year moving average the percentage of infant deaths in Nuneaton closely followed the national figures, showing a gradual decline over the period of this study. In the third quarter (Appendix 1, Graph 4) the Nuneaton and the national figures can again be seen to follow a similar pattern, with an overall decline from 1871 to 1910. Both sets of figures give a peak in the late 1890s, although it can be seen that the Nuneaton figure rises approximately 1.25% higher than the national figure at this time. This would suggest that in a normal summer the conditions in Nuneaton could be considered to follow the national average, in exceptionally hot weather, as experienced in the late 1890s, they could be seen to have deteriorated, resulting in a higher than average IMR.

When the percentage of infant deaths for Nuneaton for the four quarters are incorporated onto the same graph (Appendix 1, Graph 5), it can be seen that at the beginning of this study there was a seasonal variation between the four quarters. However, from the mid 1890s the variation in the first, second and fourth quarters was minimal, and that by 1910 there appears to have been little variation in all quarters. This would suggest that, if the high third quarter figures of 1896 to 1902 are considered to be abnormal due to exceptional weather conditions, the factors normally affecting the infant mortality rate of Nuneaton

from 1894 can be considered to be uniform throughout the year.

3.2 Geography of Nuneaton

In his report to the General Board of Health in 1849, George Thomas Clark described Nuneaton as a considerable market town originally based upon a nunnery (Appendix 2). The town was long and straggling, being built in the valley and on the banks of the river Anker, which formed the natural water channel for the whole district, and which was fed by three main tributaries, the Griff, Coton and Abbey brooks. Flooding was a common occurrence by both the Anker and the Abbey brook, both of which affected the town. Two miles west of the town in Stockingford the Griff brook fed the Seaswood Pool, the private property of Mr. Newdegate, a local land owner, although Clark reports that the many cottages between Stockingford and Nuneaton were all badly off for water. The Coventry Canal ran in one long level on the hill side, west of and above both Nuneaton and Chilvers Coton and through the latter village, and though advantageous for trade, its poor overflow systems resulted in occasional flooding of the town. However, Clark describes the general disposition of the ground in both parishes as favourable for drainage, falling eastwards towards the Anker. Nuneaton stands near the junction of new red sandstone with carboniferous rocks, actually upon gravel and loam, with Chilvers Coton partly upon coal, the mining of which gave considerable employment to the area towards the end of the nineteenth century. West of Nuneaton is a high ridge of land formed by a line of intruded greenstone which gave rise to extensive quarries, the stone from which was sold for metalling roads and for particular varieties of paving. Coton clay was used to make great quantities of bricks and tiles which were transported

by canal. The Trent Valley railway line opened in 1847, and that connecting Nuneaton to Coventry in 1850. In 1861 the Midland Railway linked the East Warwickshire coal field to Birmingham.

3.3 Clark`s Report to the General Board of Health

An awareness of the adverse effects of inadequate water supplies and sanitary facilities of the area may be seen in a Report to the General Board of Health by George Clark in 1849 relating to the sewerage, drainage and water supply of Nuneaton and Chilvers Coton. Clark stated that the general death rate for the 7 years ending September 1848 was 26.7 in the 1000 in Nuneaton and 28.99 in Chilvers Coton, figures which he considered unusually high. The report proceeds to enumerate the factors which Clark considered to be responsible for this situation, the filthy and offensive state of the courts, the few shared privies, the large cesspools which were only emptied once or twice annually and the lack of adequate drainage. To these defects he added the close proximity of piggeries, slaughterhouses, stables and depots for dung collected in the streets, although he considered the houses to be `by no means of the lowest description` and suggested that a proper water supply and drainage would completely alter the situation. Clark continued his report by making extensive recommendations for the source of a clean water supply and drainage for each house in the main areas of habitation in the Nuneaton Union as well as the paving of the courts, the removal of the cesspools and the conversion of the privies to water closets. At the same time he recognised that any remedial measure had to be cheap as Nuneaton and Chilvers Coton, though well populated were very poor. Clark concluded by suggesting that it would be difficult to over estimate the

advantages to the local population of these remedies which would include a reduction in sickness and the rate of mortality as well as the amount of out-door relief. It can therefore be seen that the necessity for an adequate water and drainage system was recognised considerably earlier than 1871. However, Clark highlighted the factor which may have been primarily responsible for the thirty year delay in laying on a public water supply in the area when he states that all public arrangements and expenditure were in the hands of the parish officers who changed annually and who acted without any fixed system. He felt that the `old village institutions` were wholly unequal to managing the needs of a growing town.

Fifty years later many of the issues covered in Clark`s report were referred to in Dr. R.W. Johnstone`s Report to the Local Government Board upon Epidemic Enteric Fever in Nuneaton and Chilvers Coton Urban District. Although the population had approximately doubled from 13,000 in 1851 to 24,000 in 1901 few of the improvements recommended by Clark had been implemented and then only in a piecemeal fashion. Although Johnstone gave some recommendations as to improvements which the Council aught to consider he did not give the same wide ranging proposals as suggested by Clarke. Both reports illustrate the overall situation in the Nuneaton Union rather than give details of particular premises, although both underline the poor conditions to be found in Abbey Street. Johnstone found that house refuse and excrement continued to be disposed of mainly by means of midden privies which were still being erected in connection with new buildings, even where sewers were available. Drains which had been laid were often untrapped and leaky, so that the surrounding soil became consequently polluted. The water supply was still

being obtained largely from shallow wells from approximately 4 to 10 feet deep and, of the 87 samples of water tested by the County analyst at the time of Johnstone`s report, 76 were pronounced unfit for drinking purposes.

Johnstone`s report shows that the GDR from all causes in the Nuneaton and Chilvers Coton Urban District was generally below that of England and Wales in the final decade of the century, although it had a tendency to rise in the last 4 years, and in 1893, 1897 and 1898 the infant death rate was high, which he attributed to infantile diarrhoea. It can be seen from the age distribution of the 114 cases of enteric fever in the town in 1899 that only 2 cases were of infants, with only one fatality. McKeown (in Szreter. 1988. p.28) noted that, before the turn of the century, the decline of mortality from enteric diseases, then spread mainly by water, was far greater than for the diarrhoeal diseases, spread mainly by food.

3.4 Employment

A study of employment in Nuneaton shows that in the first half of the nineteenth century the ribbon weaving industry absorbed half of the working population, both male and female, though much of this was undertaken in the home on a cottage industry basis. By the second half of the century ribbon weaving was in decline and the presence of a skilled work force attracted new factory based industries, such as hat making, to the town, which again offered employment to women. However the expansion of the nearby coal field form 1880 to 1905 became the backbone of the town`s development, subsequently employing 30% of the male labour force, with other male dominated industries including

quarrying, blast furnaces and brick making (Milburn, 1963)

A comparison between the national statistics and those of Nuneaton shows that for most of the period 1875 to 1900 the IMR for the town continued above average, but at the same time the CEBs for 1881 and 1891 show few incidences of married women in any sort of employment. However it has been shown that there was a high incidence of under reporting of employment in the case of married women and it is possible that the CEB does not give an accurate picture of the situation.

Garrett and Reid (1995.p.78) consider that a potential child care source can only be deemed to have been present if a servant or non-working female relative aged over 15 is observed in the household. Research concerning the employment of married women in Redditch and Bromsgrove (Procter, 1995) showed that many families employed very young girls as resident childminders to enable mothers to carry out paid work, either inside or outside the home. No similar cases have been found in Nuneaton, giving credibility to the low level of reported employment, and therefore refuting the idea of infant mortality due to neglect whilst the mother worked. It would appear that there was a range of employment for the male work force in Nuneaton and although there were industries offering suitable employment for women this was not continued after marriage. In the few incidences of illegitimate births recorded in the vaccination registers for Nuneaton it may be seen that most of the mothers were in employment and few of the infants survived their first year.

Infant mortality has been shown to be associated with a number of economic and

social indicators, such as income per head and maternal deprivation (Lee, 1991. p.55). It was suggested in the Black Report (Townsend and Davidson, ed. 1982) that the presence of any factors which increase the ability of parents to provide adequate care for an infant will decrease the risk of premature death. However, a parliamentary commission report (Horne, 1841) into child employment in South Staffordshire states that it was normal practice for babies to be cared for by older children, from the age of 7 upwards, regardless of whether mothers went out to work or not, indicating that the care of infants within the home may have been inadequate, leaving the younger siblings in a more vulnerable position than had been experienced by their elders. It would therefore appear that the view of a high IMR caused by mothers working outside the home cannot be justified.

3.5 Role of Health Visitors

Sir George Newman, Medical Officer of the Board of Education (1907 -1935) suggested mothers needed to be educated and professionally advised on infant care and domestic hygiene (Woods, Watterson and Woodward, 1989. p.119) and although Lady Health Visitors were to be found in London, Brighton, Newcastle and Manchester from the 1860s it was not until the 1890s and 1900s that they became an integrated component of the network of health services organised by local authorities.

The decline in infant mortality could be attributed to the introduction of Health Visitors offering guidance and support to the families, although, as has previously been shown, both nationally and locally the decline in infant mortality

commenced prior to this time and, as Lewis (1980.p.464) states that few towns had more than one Health Visitor per 500 births and therefore the number of visits would have been low, and the time spent with each mother necessarily brief. It would therefore seem unlikely that their introduction could have been solely responsible for the reduction in the IMR. In Nuneaton the Health Visitor only appears to have become part of the health network in the early 1900s. No confirmation of the date of appointment of the Health Visitor Miss Underwood has been found, although her report is included in the Annual Report of the Medical Officer of Health to the Local Board of Health in 1911. This shows she paid 708 visits during the year, identifying 69 infants as `definitely wasting`, 28 as `neglected due to laziness and some poverty, and 4 she recorded as being under notice to the NSPCC. She criticised parents for having their infants sleeping with them and that only 20% of infants under 9 months had their own cot or cradle. A statistical analysis of the visits of the Warwickshire county Health Visitors for 1912 (Lane p.72) is of limited use as it does not specify which areas each individual covered. Miss Underwood is included in the list but her total visits were only 213, indicating she had not undertaken as much work as in the previous year, and as there is nothing to suggest that any of the others was also employed in Nuneaton, the figures recorded can only be taken as a sample of families in Nuneaton and not as a true picture of infant care. Under the heading `Modes of feeding`, Miss Underwood had recorded that of 85 infants visited 49 were breast fed, 2 partially so, and 6 were artificially fed but no indication is given as to how the remaining infants were fed. Similar discrepancies occur in 6 out of the 11 statistics, although the general impression is given that, at the first or second visit, approximately two thirds of the infants visited in the county in 1912 were breast fed. Under the heading `Housing defects` Miss Underwood

recorded 4 cases of over crowding, 5 of damp houses and 7 of dirty rooms. By far the greatest fault she noted was unventilated pantries, recording a total of 25.

3.6 Local Charity

Nevertheless, some support and information was available to mothers in the form of a Nuneaton charity, founded in 1831, known originally as the `Lying In Charity` and later as the Nuneaton Maternity society, was credited with reducing the mortality of both mothers and infants. The only written report on the activities of the society appears to be that in the Nuneaton Chronicle of January 16th 1920 which states that for many years the work was undertaken by a Mrs. Estling, and covered Nuneaton itself, but in later years this was extended to cover Chilvers Coton and Attleborough. The number of visitors and the criteria governing the families visited are not specified, but special attention was paid to the pre-natal care of mothers and powdered baby milk was distributed at cost. Baby linen was also made available to mothers, although there is no indication as to whether this was sold, given or loaned to them. The report was to record the winding up of the society owing to the exhaustion of funds and states that to a large extent the work of the society had been replaced by the National Insurance Infants Welfare Centres. No figures are given to indicate how extensive was the work of the society, but it would certainly suggest that the IMR of the Nuneaton Union could have been higher without their activities. The report concludes by saying that `the great need at the present day in Nuneaton is for a home in which delicate cases may be treated`, suggesting that premature babies and `feeble births` continued to contribute to the IMR well into the twentieth century.

3.7 Classification of Infant Deaths

In the Table of Deaths for 1912 (Lane) a year in which 120 infant deaths were recorded in Nuneaton, one of the major causes is grouped as `Congenital Debility and Malformation, including Premature Birth`, a classification which accounted for 62 of the 438 recorded deaths although not all of this number may be expected to be deaths of infants. This may be compared with figures of 1911 (MOH Annual Report) which shows of 133 infant deaths, 21 due to premature birth and 24 due to atrophy, debility and marasmus (what may today be termed as `failure to thrive`) suggesting a possibility that 1/3 of infant deaths had ante-natal causes. Research (Spring Rice, 1939) has shown that as late as the 1930s many working class women experienced numerous pregnancies, combined with increasingly poor health and a lack of affordable medical attention and it could be suggested that a major contributor to the decline in the IMR was a reduction in the number of pregnancies experienced by individual women with a greater likelihood of pregnancies resulting in healthy babies able to withstand the risks to life experienced in infancy.

3.8 Medical Officer of Health

The Medical Officer of Health for Nuneaton throughout most of the period 1871 - 1911 was Dr. E. Peacock In June 1873, the Nuneaton Chronicle reported that the Local Board of Health had unanimously voted to advertise this post `until next Lady day`, and, later the same month, its readers were informed that Dr. E Peacock, already the Medical Officer of Health for Chilvers Coton and Bulkington, had been appointed on a salary of £20 per annum. By August 9th

1873 the paper was carrying extensive reports on the public health issues in the town given to the Board by Dr. Peacock, stressing the necessity of immediate action to prevent the out break of cholera. His actions were not always considered adequate, as shown by a letter sent to the newspaper on October 4th 1873 by the Vicar of Nuneaton, complaining of the `abominable and unhealthy stenches` in Abbey Street and Wheat Street, the cause of which he partly attributed to pigsties which, he stated, had been sanctioned by Dr. Peacock. Although the Medical Officer of Health continued to make reports to the Board over the following 25 years there is no indication that he instituted any of the action which was necessary to raise the standard of public health in Nuneaton. In August 1897 his report contained the following remarks concerning the IMR of the Nuneaton Union:-

`I have on many occasions drawn your attention to early and improvident marriages, ignorance of the mothers as to the proper diet for their children, the administration of noxious drugs, such as the various kinds of soothing syrups and what I term the hardening process of bringing children up, sufficient care not being exercised during the ever changing climatic conditions. To some if not all of these causes must be attributed this high death rate in children. The difficulty is to provide a remedy`.

3.9 Vaccination

Although Dr.Peacock laid much of the blame for infant deaths on the parents, as has been shown, a gradual decrease in the IMR was taking place, for which various issues could be considered responsible. The introduction of compulsory vaccination of infants against smallpox in 1871 could be deemed a major factor,

as this coincides, both locally and nationally, with the decline. That action was taken to enforce this measure may be illustrated by an item in the Nuneaton Police Intelligence, a column in the Nuneaton Chronicle dated Thursday May 29th 1874, which reported that a William Starkey was summoned for neglecting to have his child, born July 5th 1872, vaccinated. Starkey was fined 2/6 and ordered to pay 12/- costs. This appears to have been an unusual case in that it was taken to court, as many others committed the same offence without apparent consequences. However an announcement on the front page of the Chronicle on April 17th 1896 stated that,

`Owing to the prevalence of smallpox the Guardians of the Board of Health at their next meeting are to consider taking summary proceedings to recover penalties against parents failing to have their children vaccinated. The plague of smallpox is due to failure to comply with the law. C.Blakeway. Deputy Clerk`.

The 1896 Annual Report of the Medical Officer of Health states that there were no cases of smallpox in the town that year, so the last statement must be taken to refer to smallpox in general and not a particular outbreak. No further action appears to have been taken.

The Vaccination Registers for the Nuneaton Union for 1871 show that 62% of infants were vaccinated, although 17% of those were vaccinated after their first birthday and in 1893 only 18.5% of infants were vaccinated, with 41 (28.5%) being vaccinated after the child`s first birthday. The registers were maintained over a considerable period of time and 16 of the 1893 entries can be seen to have been vaccinated between April and October 1905. By 1906 the rate of vaccination had greatly increased, being 52% with 29% obtaining exemption certificates, a total of 81%. The dates of infants` deaths were recorded in the

vaccination register only if death occurred prior to vaccination and not if the death was during the infant`s first year. The `Registrars returns to vaccination officer of infant deaths`, which are available for Nuneaton from 1872 to 1925, recorded the deaths of all infants of one year and under, but show the number given in the vaccination register only if the birth of the infant was registered in that union. In the case of a developing area, such as Nuneaton, with a high level of in-migration many infant deaths are registered which cannot be cross referenced with the births in the Vaccination Registers.
Equally it must be assumed that not all infants born in Nuneaton, even though not appearing in the Return of infant deaths, did in fact survive the first year, as even fairly local relocation could have taken the family outside the registration district, and therefore any statistics gained from the registers must be considered to be approximate.

It could be considered that the decline in IMR was as a direct result of vaccination, with the late 1890s increase due to the failure of parents to adhere to the law. However this would then make the assumption that infant deaths were in fact due to smallpox. In his Annual Report in 1880 the Medical Officer of Health highlights the fact that 13 infant deaths were due to `feeble births`, 20 to diarrhoea and others due to whooping cough, measles and scarletina, and diarrhoea was the cause of 27 deaths in August 1898 of whom 15 were infants, but no mention is made of deaths due to smallpox. There was at this time an increase in the IMR, but as has been shown, a high percentage of infants were not in fact being vaccinated and it would therefore seem reasonable to deduce that smallpox was not a major cause of infant mortality in Nuneaton, and therefore vaccination could not be considered a reason for its decline. This view

is supported by The 1911 Annual Report which states that 137 infants died in the year, listing the chief causes of death as:-

Diarrhoea & enteritis 30

Premature birth 21

Atrophy, debility & marasmus . . .24

The underlying factors were considered to be the ash pits and privies which in hot weather attracted flies which then contaminated food, improper feeding and a lack of proper accommodation for standing milk and food in the houses of the poor. If vaccination cannot be considered the reason for the decline in infant mortality it is then necessary to investigate other factors.

3.10 Sewerage

The prevalence of diarrhoea in infants, particularly in the hot summers of the late 1890s, when infant deaths were highest in the third quarter of the year, indicates a poor level of hygiene. The necessity for an adequate water supply and sewage system had long been recognised, as shown in the Report to the General Board of Health by George Clark (1849) which made recommendations as to how the majority of the area could be supplied. In conjunction with this issue, that of the sewage problem led Clark to describe certain localities in Nuneaton as `seats of fever and small-pox`, finding them to be `ill paved, damp, undrained and in a very filthy and offensive condition`. At the time of Clark`s report the majority of the population of the area were living in courts consisting of 5 to 15 houses each, connected to the main street by a narrow covered entry and open to the fields behind. Within each court there were one or two common privies, a large open cesspool with a pump often very nearby, and frequently, a

pigsty, with a drain to take surface water and other refuse towards the field, where there was an open stagnant ditch . The cesspools were approximately 10 to 12 feet square and very deep and into them were discharged the contents of the privy and all the household waste and rubbish. They were emptied only once or twice annually, frequently becoming heaped up above the walls, the contents seeping through into the streets, or where adjacent to a house through onto the floor, making the house uninhabitable. Clark included in his report the returns from parish officers which showed that in Nuneaton there were -

Pigsties	287
Privies	385
Cesspools	346
Slaughter-houses	15

At the end of the first half of the nineteenth century the only sewers in the Union were in Nuneaton town itself, these being only very short in length and laid so that in one place a large sewer discharged into a small one. In Back Street there were approximately 270 yards of sewer, this being the only one in the town laid deep enough to drain a cellar, while in Abbey Street and the Market Place some surface culverts and short lengths of 9 inch piping complete the whole of the street drainage. The usefulness of these drains must have been limited as Clark states they were badly laid as to level, which he did not consider surprising as they had been put in` by eye`. The gratings leading to the culverts were extremely large enabling much solid refuse to be carried into them, resulting in `stinks which were much complained of by the inhabitants`. As a result of such poor drainage, water stood in various parts of the town, particularly in the lower parts, notably in the allotment grounds north of Abbey Street and on the roadside

between Nuneaton and Attleborough.

At the time of Clark`s report the only water supply consisted of that from pumps, taken from wells 9 to 25 feet deep within the courts. This water was too hard for washing purposes and for this rain water was collected in tanks or from the roofs, which in themselves were foul and as a result the water collected was dirty as well as being in short supply. Those living close to the River Anker used this for washing, but in the summer, when particularly needed the river water was low and very dirty. At Heath End, due to the high position of the village, which stood on permeable sandstone, water was in very short supply, a situation only partially addressed by some work carried out at the expense of Mr. Newdegate, the local landowner.

It would appear that little changed in the succeeding twenty years when a report in the Nuneaton Chronicle of January 7th 1871, on a meeting of the Nuneaton Board of Health, was headed `The Sewage Problem`. Subsequent fortnightly reports show that an attempt was being made to borrow £9,000 with a view to constructing a sewage works to service the town. By March of that year a loan of £8,200 had been obtained and the work put out to tender and by March 23 the following year the Chronicle reported that the `works for disposal of sewage` were nearly finished. In January 1873 a meeting was convened to consider an application to borrow a further £2,000 for the completion of the sewage works and the sewage outfall. This was obtained three months later. However, this did not resolve the issue of sewage disposal in Nuneaton.

In May 1874 problems arose at the sewage works due to the large quantity of

water discharged into the sewers by the Nuneaton Wool Company which the Chronicle reported as resulting in sewage flowing into open drains at Tuttle Hill. In August the same year it was found that the sewage was not being properly treated causing alterations to be made at the works. Problems in dealing with sewage were not confined to Nuneaton and on July 11 1888 the Minutes of the Nuneaton Board of Health records a resolution to write `again` to the Local Government Board concerning the sewage from Hinckley which was being discharged into the Sketchley Brook and causing problems in the Nuneaton area. This does not appear to have had any effect as in September 1890 the Surveyor was asked to inspect this water course and to make a report to the Board, and in April 1891 the attention of the Board was drawn to the state of the Anker above Nuneaton which was said to still be polluted with sewage from Hinckley.

In 1871 the local newspaper reported a discussion by the Board of Health concerning plans for the conversion of privies to water closets. This process took over fifty years to complete. In 1901 J.S.Pickering, Surveyor to the Local Government Board, wrote that the change from privies to wcs had been a somewhat gradual process and that at this time more than half the houses were still provided with privies. He regretted that the powers of the sanitary authorities were so limited that they were unable to abolish the insanitary privy system especially in highly populated areas. In 1891 the Sanitary Inspector in his Annual Report claims that many of the wcs in the town were of a most insanitary type, having an iron D trap and a very inadequate supply of water. He continued by saying that he was surprised to find so many sanitary defects, not only in cottages, but also in properties of a superior class. The Medical Officer of Health

Report for 1919 states that the standards in the courts had seen little change in the preceding forty years and that they were still lacking in modern sanitation. He went on to say that 136 houses in Abbey Street, when inspected that year had 1 living room, 1 bedroom, shared earth closets and no piped water. The provision of a safe water supply within the area was an equally slow process.

3.11 Water Supply

In December 1872 the Nuneaton Chronicle, reporting on a meeting of the Board of Health, stated that the board had power to deal with the pollution of wells and that therefore notices would be served on owners of property in order to rid the town of nuisances. Nevertheless, Dr. R.W.Johnstone, in his Report to the Local Government Board in 1899, stated that the water supply was still largely from shallow wells, although many houses were supplied from the public water supply established in 1888 by the East Warwickshire Water Works Throughout Nuneaton water was to be found at a depth of 4 to 10 feet below the surface and of 87 samples tested by Dr. Bostock Hill, the County Analyst, shortly before this report,76 were found to be polluted and unfit for drinking purposes. Johnstone suggests that direct pollution may have occurred due to the proximity of old drains to the openings of the wells, and, in addition, that leaky privy pits and sewers polluted the ground water, thereby affecting particular wells or series of wells.

The Annual Report of the Medical Officer of Health for 1892 reported some tests on samples from wells which show that poor water supplies were not restricted to the poorest districts, although the sample from the well at 15 Court, Abbey Street

was reported to be polluted by sewage to an enormous extent and absolutely unfit for drinking purposes. A sample from 10, Bull Street, Attleborough was condemned in the same terms and another sample from the same street taken a few days earlier was said to appear fairly clean, but to be polluted to a large extent with organic matter of animal origin and to be unfit for use for drinking. A similar report was made on a sample from a property in Hinckley Road, an area considered to be of a better class at this time. While some samples were condemned outright, others were noted as to be regarded with suspicion, and even though tests of the sample from the public water supply showed it to be `of great purity` its appearance was not good, being slightly turbid. This problem of turbidity continued for a considerable length of time and an analysis on the different sources of the public water supply in September 1899 describes them as ranging through `slightly turbid`, `turbid` to `slightly turbid with yellow deposits`. This would suggest that for some people their own well might appear to offer a preferable supply of water and Johnstone indicates that there was a strong prejudice against using the public supply for drinking water. New filter beds were to come into use at the Waterworks at the beginning of 1900 which he felt would bring about the necessary improvements.

It can therefore be seen that even where documentary evidence shows property to have a wc and mains water supply it cannot be assumed that associated health risks had been eliminated, the wc might have been of the old insanitary type and the appearance of the public water supply may have caused the householder to use well water for drinking purposes. Any infant who was not exclusively breast fed would be at risk of infection from polluted water, and the continued use of wells after the establishing of the public water supply could

explain why the decline in the IMR only occurred gradually.

3.12 Housing

The new terrace property which was built in Nuneaton between 1890 and 1905 must have offered their occupants a better standard of living than that experienced in the old court houses. Milburn (1963) described a typical court house as having only 2 rooms, one outside door and the bedroom originally reached by a ladder. Later a staircase may have been added and the bedroom partitioned into two. The ground floor was frequently one step below the level of the court outside and the height of the ceiling approximately six feet. Within the living room there was a stone sink and a fireplace. This may be compared with the specifications of four cottages erected in Wheat Street in 1890 by a builder, William Smith for £460.

Footings were to be dug to a depth of 12`` and the soil removed from under the parlour, living room and scullery floors, the space to be filled in with ashes. Drains were to be laid to `a good depth`, giving a good fall, with 6`` mains drains and 4``drains from the wc. Glazed pipes were to be jointed in cement and mains water to be laid on by the contractor to all houses and wcs. The kitchen, larder and scullery floors were to be laid in best 9`` quarry tiles and the same to be used for the hearths in the bedrooms. The windows were to be opening casements with 2 air bricks under each parlour floor and an air brick in each pantry. A copper with a lid, a pantry with 2 shelves and a floor to ceiling cupboard in the kitchen were also included in these properties.

Although these specifications relate to houses in Wheat Street, this style of property was very typical of local building of this time. Wheat Street itself consisted of houses from different eras of building, but other streets, for example Fife Street were built altogether and can be considered an example of many other streets in the town. A comparison between the IMR of infants born in Fife Street and in Abbey Street in 1893 and 1906 may be seen to indicate that improved living standards were a relevant factor in the decline of infant mortality in Nuneaton.

Table 1 IMR in Abbey St and Fife St - 1893 and 1906

	Abbey St	Fife St.
Born 1893	54	15
Died 1893	16	3
IMR	296	200
Born 1906	33	9
Died 1906	5	1
IMR	151	110

(Data collected from the Vaccination Registers for the Nuneaton Union1893 and 1906 and the Registrars Returns to the Vaccination Officer of Infant Deaths, 1893 and 1906)

This table may only be taken as an illustration of the situation in differing types of accommodation as many other streets and years would need to be considered to confirm the suggestion. However it would appear that a higher standard of living accommodation could have some bearing in a decline in infant mortality in Nuneaton.

Although Clark, in his report of 1849, describes the population of the Nuneaton Union as `very poor`, Milburn (1963) suggests that at the turn of the century the population on the whole experienced a reasonable standard of living. A major factor in this change could be attributed to the development of the Warwickshire coal field, with 5029 of a total of 14269 working men on the 1911 census being in coal mining. He gives the average earnings of a coal face worker in 1900 as 30/- per week, rising to 38/- by 1914. This would suggest that over the second half of the nineteenth century the standard of living in the Nuneaton was gradually increasing, which, coinciding with the decline in infant mortality in the Union, offers further support to this opinion.

3.13 Social Classification

Armstrong`s social classification for York of 1851 was used in order to assess the socio economic grouping of the children born in Nuneaton in 1893 and 1906. Although this classification offers a useful tool it may be seen to have some limitations. It is necessary to make judgements on those occupations not included in Armstrong`s list and, as in the case of coal miners where large numbers are involved, a misjudgment could significantly alter any statistics gained. Over a period of half a century the status of a particular occupation may change from one group to another. However, unless there are considerable numbers in a specific area of employment any variations will have only a limited effect on the final statistics and as Armstrong`s classification offers only 5 different categories each group allows for diversity. The accuracy of classification depends upon the original reporting of employment and although it may be presumed that there are some errors their impact should be minimal as

the statistics obtained have been used only to indicate a trend. By classifying the occupation of the fathers of all children entered in the Vaccination Registers for 1893 and similarly those in the Return of Infant Deaths a percentage figure of deaths of infants in each socio economic group was obtained. This was then repeated for 1906. It can be seen that the two sets of figures vary only slightly and show that the lower down a family was on the socio economic scale the greater the chance of their infant`s death.

Table 2. Infant Deaths in Nuneaton by Socio Economic Grouping 1893 & 1906

Socio economic groups	1	2	3	4	5
Total births 1893	2	29	474	225	3
Total infant deaths 1893	0	3	61	42	1
Percentage deaths 1893	0	10.3	12.86	18.66	33.33
Total births 1906	4	29	773	242	0
Total infant deaths 1906	0	3	105	46	0
Percentage deaths 1906	0	10.3	13.5	19	0

(Data collected from the Vaccination Registers for the Nuneaton Union1893 and 1906 and the Registrars Returns to the Vaccination Officer of Infant Deaths, 1893 and 1906)

The figures in socio economic groups 1 and 5 are so small they cannot be taken as adequate data as a single birth or death would have a disproportionate impact upon the results (one more death in 1893 in group 5 would have changed the percentage death rate by 33.3). However the figures in groups 2,3

and 4 are sufficiently large to remove such random errors. This would suggest that the decline in infant mortality could relate to the increase in employment in higher socio economic groupings, which could be found in such areas as the East Warwickshire coal field.

4 Case study

In order to investigate the decline in infant mortality in Nuneaton between 1871 and 1911 the main primary source has been the vaccination registers for the Nuneaton Union which are available from 1859 to 1924. The Nuneaton Union was not divided into sub-registration districts so entries for seven parishes are gathered in the same register. The registers which have been studied are those for 1871, 1893 and 1906 and all were found to be clearly written and easily legible. Entries in the vaccination register depended upon the family of the infant to report the birth and it is not possible to know how many families failed to do so. This may have occurred for a variety of reasons such as illegitimacy or in order to avoid vaccination. It is not possible to check the accuracy of the registers and it must be recognised that errors may have occurred in the original entry of data possibly due to the informant being illiterate or to an oversight by the recorder.

The place of birth given in the vaccination register can be very generalised, many in the earlier Nuneaton registers giving only the name of the parish, making any nominal record linkage or localised study particularly difficult, although details giving streets and the number of a house occur in later years. In some streets the property was developed at one time, whereas others were constructed over a long period, with houses having very variable standards of

sanitation. Without precise addresses being given it is not possible to assess the standard of living experienced by a particular family. The vaccination register gives the employment of the father, or that of the mother in the case of an illegitimate birth. This can indicate the social classification of the family and can assist in the identification of a family in nominal record linkage, although in an area such as Nuneaton where a high proportion of the working population were employed in the same industry, in this case in coal mining, this may have limited value.

In recording the infant births and deaths for 1893 and 1906 it could be seen that some names, apparently the same families, occurred in both years. This then raised the question of how many infants were born in families and how many subsequently died in the first year of life. In order to consider this issue all infant deaths were recorded in the years 1881 to 1891 inclusive, these years being selected to allow for possible nominal record linkage using the CEBs of 1881 and 1891 (Appendix 3). Each individual death was noted using surname, father`s first name, address and occupation, with each year`s recorded names being placed in alphabetical order. On the completion of the data for the years in question each name was checked against those in other years, with linkage only being made where all four factors coincided. It is possible that some multiple deaths were lost where there had been a change of occupation or address, but this seemed preferable to making incorrect assumptions.

At the end of this exercise it was seen that five families had lost four infants, fifteen had lost three and fifty eight had lost two infants. The deaths of twelve sets of twins had also been recorded. The total number of infant deaths in the

Nuneaton Union in the period 1881 to 1891 was 836, over 25% of which were accounted for by the 90 families experiencing multiple infant deaths. In order to consider what factors could offer an explanation for infant mortality in Nuneaton it seems appropriate to study some of these families. A search was then made on the CEBs for 1881 and 1891 for the families who lost three and four children, twenty in total, and of these fourteen were located in the Nuneaton area.

The CEBs give the address of a household, and although not necessarily including the number of the particular house, often showing a family to be living in one of the courts behind, rather than on the street given in the vaccination register. An indication as to the conditions under which a family was living could be obtained as the number of rooms occupied by a household is given, if less than five. The name of the head of the household and their occupation are given which enables a cross reference to be made with that given in the vaccination register. The name, age, status, and employment of the other members of the household is given. This shows the age of the mother and indicates how many living children she has born although, as relationships are given in relation to the head of the household it must be noted that a `wife` may be from a second or subsequent marriage and not necessarily the mother of the children. Older children may have already left home or may be living locally with other family members. However, by looking at the 1881 and the 1891 CEBs relationships may be more accurately determined. The place of birth of all members of the household is included in the CEB and often indicating whether the family has undergone a number of moves or whether they have remained within their own locality, suggesting the possibility of extended family support in the rearing of the family.

Of those families in this study who lost four children in this period four were found on the 1881 and 1891 CEB (Appendix 3), 2 were living in 4 rooms at Heath End and Stockingford respectively, and in 7 Court, Abbey Street, a family of six were living in only three rooms. However, the fourth family, that of Charles Hewitt, a fishmonger living on Abbey Street with his wife and six children, presumably had 5 or more rooms as this was not indicated on the CEB. This would indicate that overcrowding could be considered a factor in some cases, in others this was not so apparent. The 10 families experiencing the loss of 3 children who were traced on the 1891 CEB were also to be found residing throughout the Nuneaton Union, suggesting that if any external factors could be considered responsible for infant mortality they were Union wide rather than localised.

Information as to the occupation of each member of the household contained in the CEB shows that in the case of Nuneaton very few married women were in paid employment at this period, although this was often proposed as a cause of infant mortality by contemporary writers. Although ribbon manufacturing had declined, there were several local industries which employed women but the incidence of married women in employment appears to be extremely low. In those 12 families with living children only two women are reported as in paid work in the 1891 CEB, one a dressmaker and the other a ribbon weaver, both of which occupations were likely to have been carried out in their own home. Of the two who appear to have had no living children, the mothers had been 25 and 27 on the death of their first child. The occupation of one of these women is given as `Postmistress` in the CEB, which would indicate a reasonable level of intelligence and an ability to learn, making it difficult to lay the blame for the death of her three infants on maternal ignorance. In these cases it is possible

that, following he deaths of their infants, the women would return to work as they had no infants to care for, and could be an example of reverse causality, where instead of the women`s work causing the deaths of the infants, the deaths faoilitated the work.

Contrary to the explanation made by Dr. Peacock in 1897 that many infant deaths were due to `young and improvident marriages`, in twelve out of the fourteen families older children had been raised successfully before the death of subsequent infants. While it could be suggested that there may have been older siblings who had also died before 1881, this data shows that successful child rearing had occurred prior to the deaths of the particular infants recorded in the Return of Deaths of Infants between 1881 and 1891 and that the lack of parental ability could not be deemed a satisfactory explanation for the death of these infants

It can be seen , using the data collected from the fourteen families studied, that the chance of a child surviving infancy decreased with each successive pregnancy (Appendix 4). This would indicate that external factors, such as the quality of the water supply, was not a major issue as its impact should have an equal effect on all the infants born in a family. However, it may be suggested that if the health of a mother deteriorated with repeated child bearing, and as has been shown there with little practical help within the home to assist with the volume of work created in coping with an increasingly large family, the possibility of her being able to breast feed would decline and, if infants born later in a family were dependent upon artificial feeding, they would then be more susceptible to infection as a result of poor water supply. It would also seem

reasonable to suggest that as a family increased in size the quantity of food available per person would be likely to decrease, also contributing to the deterioration in the health of a mother and a reduction in her ability to breast feed her infant.

Of the fourteen families in this study, the age of one mother is unknown as she died prior to the 1891 census. However, as her eldest daughter was 20 at this time it would seem reasonable to assess her age as approximately 40 by the time of her death. This must have occurred at some point following the birth of her last (eighth) child in September 1890. Of the twelve mothers who successfully reared some of their children, a total of forty infants failed to survive the first year of life. Only 7.5% of these were born to mothers under the age of thirty and 5% to mothers over the age of forty, indicating that, with increasing age and repeated child bearing, there was a greater risk of giving birth to sickly babies who had little chance of survival however good a standard of care they received. This would account for the large proportion of deaths recorded as being due to developmental and wasting diseases identified by Lewis (1980). A decline in fertility would reduce the number of these babies born in the later child bearing years, towards the end of large families, and thereby lower the IMR.

An analysis of all the infant deaths recorded from 1881 to 1891 show that the greatest percentage of infant deaths occurred in the first month. (Appendix 5) If, as suggested by Newsholme, most mothers breast fed their babies the possibility of any adverse effects of polluted water supply should have less impact in the earliest weeks of an infant`s life, and it would be reasonable to expect the IMR to increase during the first year as mothers weaned their infants. However as it can

be seen that the reverse is true, it would suggest that early infant deaths were more likely to be a result of the poor state of health of mothers, resulting in sickly infants or to poor hygiene and medical assistance at the time of delivery. It is noticeable that the number of deaths in the first month increased considerably in proportion to deaths in the following months between 1881 and 1891, a trend which continued to a lesser extent in 1893 and 1906. This could suggest that some factor, possibly improvements in public health, was reducing the number of infant deaths after weaning towards the end of the 1880s, and that by the early years of the twentieth century other factors, such as the decline in fertility, were contributing to the reduction of infant mortality in the first month of life.

In the households under consideration only one resident servant was recorded, entered on the 1881 CEB. (Appendix 3) which occurred in the household of Isaac Perkins , a farmer with 123 acres, employing 2 men. There is no indication as to whether the 15 year old servant fulfilled domestic duties or alternatively was employed in farm work. At this time the family consisted of Isaac, his wife Sarah and seven children ranging from 11 months to 10 years of age and subsequently the couple had three more infants, all of whom died in their first year. Another resident in this household is a 65 year old widow entered as `mother`. This is the only instance in the families studied of any family member living in a household who may have been able to undertake some of the domestic duties, reducing the burden of work placed upon the mother of an increasing family and therefore possibly lessening the effect on her health and that of her infants. It must be noted that more children survived infancy in this family prior to any subsequent deaths than in any other in this study.

Although in the poorest families there would have been little or no possibility of accommodation for extended family and no opportunity of domestic help, several other families could have been expected to have assistance within the household. The family of Robert George Blofeld, a Supervisor for the Inland Revenue, lived in Severn Cottage, Hinckley Road, an area described by Milburn as consisting of better class property at this time. However, the 1891 CEB records no resident household help. It could be argued that as there were three older daughters living at home, aged 17, 16 and 15, there would have been no need for paid help but this does not conform to the Victorian ideal of the leisured wife and daughters (Levine 1987).

It has been suggested that there was a greater likelihood of female infants, especially those towards the end of a large family, rather than male infants, being neglected and subsequently dying. However, of the families studied 27 male infants died in the period 1881 to 1891, as opposed to 19 females and no apparent pattern which could indicate gender related death due to neglect can be ascertained.

From the CEBs it can be seen that of the fourteen families studied only 2 of them had migrated to the area, those of Robert Blofeld and Charles Hewitt. The three older daughters of Robert Blofeld were born in Devon,Cornwall, and Reading, his wife in Gloucestershire and he himself in Exeter. Charles Hewitt came from Wolston in Warwickshire and his wife from Worcestershire, with their two eldest children being born in Coventry. Unless other family members moved to the same area, which cannot be accurately determined, it would seem reasonable to assume these families had no extended family support during their child rearing

years. It can be seen that there was very limited help for many mothers in Nuneaton and that paid or resident domestic help was extremely uncommon although it is possible that some family support was available for those from the local area. Conversely, residence in a different county to that of birth has been considered as a measure of economic well-being, which may be associated with better prospects of child survival. (Garrett and Reid, 1995)

The possibility of congenital defects being responsible for infant deaths cannot be discounted, especially in the case of the two couples who failed to rear any of their infants. However this may also have been an issue in combination with other factors previosly considered in the other families studied

5 Conclusion

It can be seen that a variety of social and medical factors may have contributed to the decline in infant mortality between 1871 and 1911 and that variations in the IMR may have been the result of prevailing localised situations. It would, however, seem that Dr.Peacock`s view of parents bearing the sole responsibility for the IMR in Nuneaton was too simplistic an explanation for an issue which has been shown to be open to influence by a wide variety of factors, and this opinion cannot be sustained. It can be shown that the decline in the IMR in the Nuneaton Union occurred gradually over a considerable period of time. This would suggest that no one event was responsible for this decline, but in fact resulted from a combination of changes

Statistically it has been shown that in the first half of the period of this study there

was a definite seasonal variation in infant mortality, but in the later years this variation was minimal. It would seem possible that this change could be related to improvements in public health factors, especially apparent in new housing in the town. With the growth in the population the proportion living in more sanitary conditions gradually increased, thereby contributing to a decline in the IMR, although the standards in much of the older property took much longer to improve.

Much of the development of Nuneaton took place between 1885 and 1905, with the building of many terraced houses, which offered a better standard of living than that experienced in the old courts of the town, and this study has shown that the incidence of infant mortality appears to have been lower in the newer housing. The date of the decline in the seasonal variations in infant mortality in the Nuneaton Union can be linked to the date of housing development and it would therefore seem appropriate to consider that one of the social factors implicated in the decline of infant mortality in Nuneaton is improved quality of housing. Public health measures, although identified in the middle of the nineteenth century as essential to the well being of the community, were only implemented in a piecemeal fashion over a long period of time, with some parts of the town still without adequate water and sewage systems after the First World War. Although all infant mortality cannot be considered to be a result of this, it appears to have been a major factor in the increased IMR which occurred in the 1890s. If, as claimed by Newsholme, the greater proportion of infants were breast fed, the effects of a deficient water supply would have had a limited effect until they were weaned, but it has been shown that the highest incidence of infant deaths occurred in the first month of life. Other factors must therefore have

been a major cause of infant mortality

Although the MOH for Nuneaton considered the ignorance of parents as mainly responsible for the deaths of their infants, it can be seen that there was a charity offering advice and practical help to the poorer families in the town from 1831. Without any further detail upon the work of this organisation, the report from the local paper would indicate that their work had brought positive benefits to the community, and would suggest that from early in the century the IMR had been affected by this charity. Although much criticism was levelled at working mothers during this period, there is little to indicate that married women in Nuneaton formed a significant part of the work force, the dominant industries employing mostly men. However, it has been noted that there was much under reporting of women in paid employment in the CEBs of this period and therefore a true picture cannot accurately be ascertained.

The cause of infant deaths has not been attributed to smallpox, and therefore the decline in the IMR cannot be attributed directly to the increase in vaccination, especially as during the middle of the period studied the vaccination rate decreased. However, it may be suggested that the increase in vaccination by 1906 could indicate a greater awareness of health issues by parents and a refusal to accept the inevitability of a high infant death rate. It has been shown in the families investigated in this study that the lower down the family an infant was born the less chance it had of surviving infancy. This could relate to several different factors. With increased numbers of pregnancies there was a greater chance of the mother`s health deteriorating and of her delivering a more feeble infant, with a reduction in the possibility that the mother would be able to breast

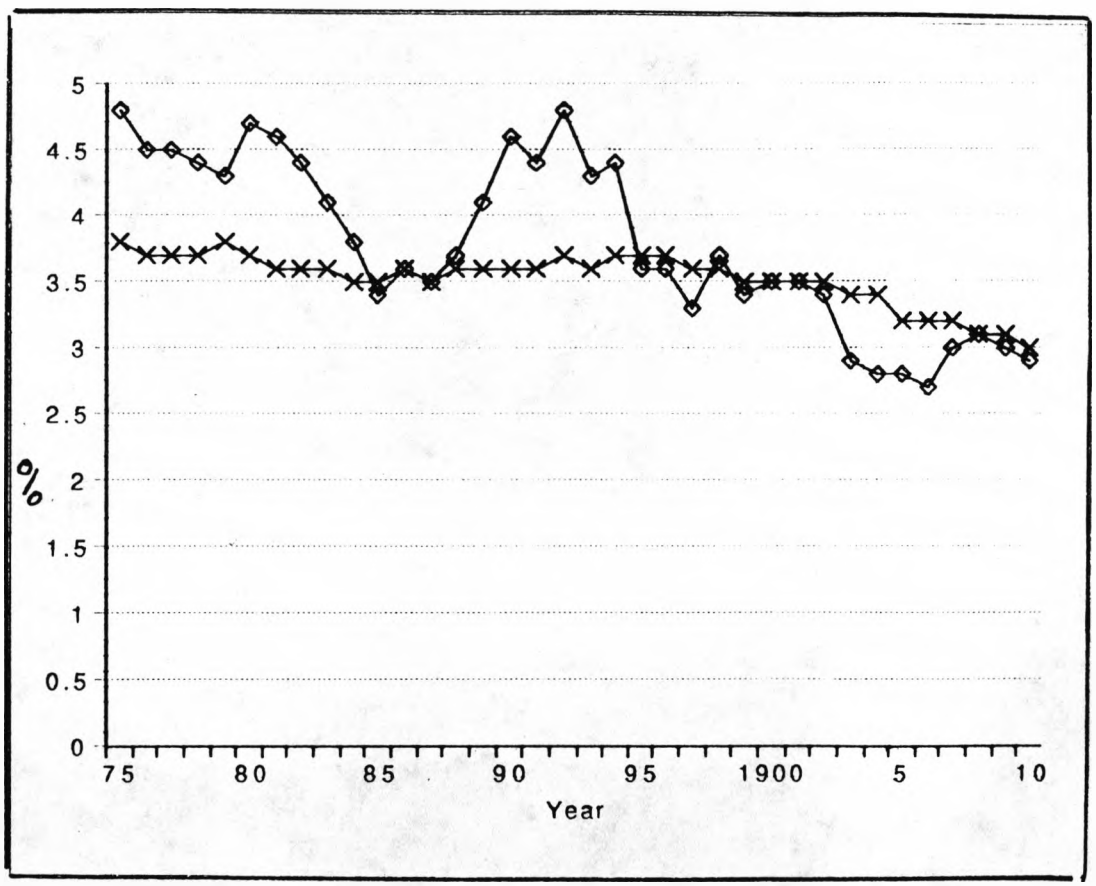
feed the child and therefore a greater susceptibility to infection. The larger the family the less individual care would be available to each child and there would be less likely hood of an adequate diet. Overcrowding may have also been a contributory factor to the poor survival rate of infants in large families, as the result of a higher risk of infection, and the possibility of a less safe environment. As the causes of the deaths of these infants cannot be ascertained no definite conclusion can be drawn. However, within the small sample available it can be concluded that the data gathered indicates the larger the family the greater the possibility of infant deaths and it could therefore be considered that as fertility declined the IMR also declined.

Many of the factors affecting infant mortality can be seen to have been beyond the direct control of parents, and therefore the criticism of them made by Dr. Peacock was ill founded. However, it could be suggested that, as the size of families declined, the health of mothers and of the infants they did have improved, thereby reducing the IMR. From this aspect the parents could indeed be considered responsible in accordance with the views of the MOH.

Appendix 1

Graph 1

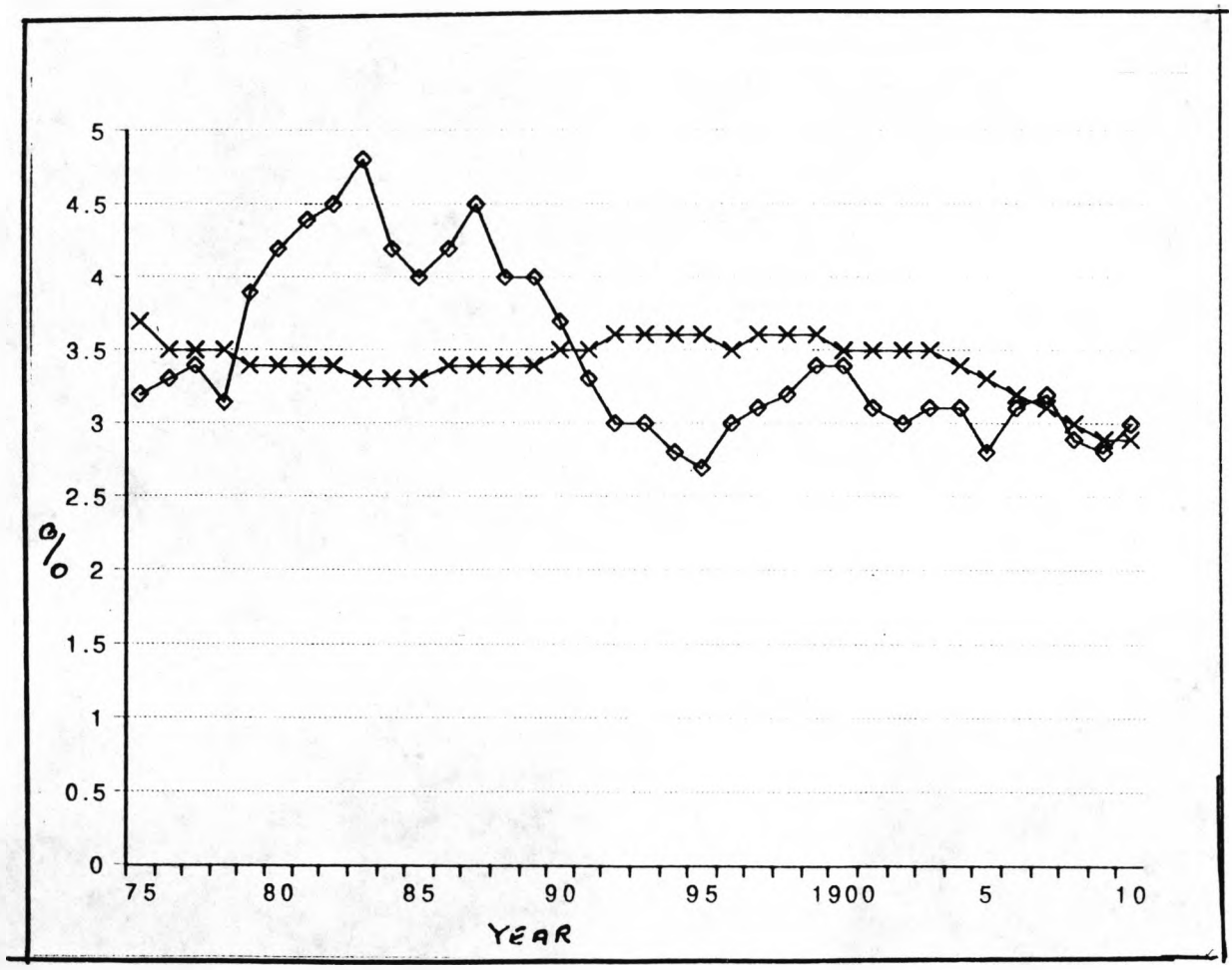
First quarter infant deaths as a percentage of live births as a five year moving average from 1871 to 1910 for Nuneaton and for England



◇.....Nuneaton X.....England

Graph 2

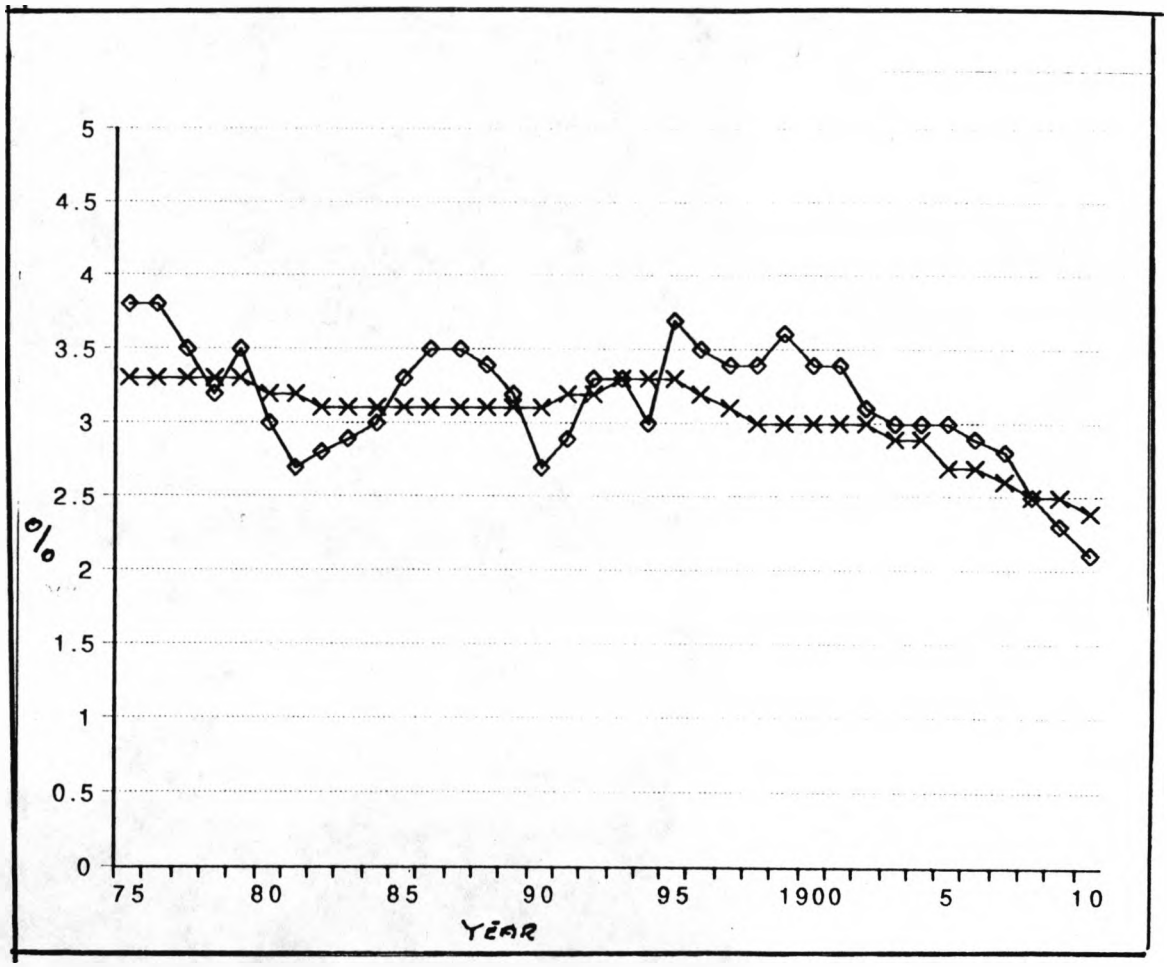
Fourth quarter infant deaths as a percentage of live births as a five year moving average from 1871 to 1910 for Nuneaton and for England



◇....Nuneaton X.....England

Graph 3

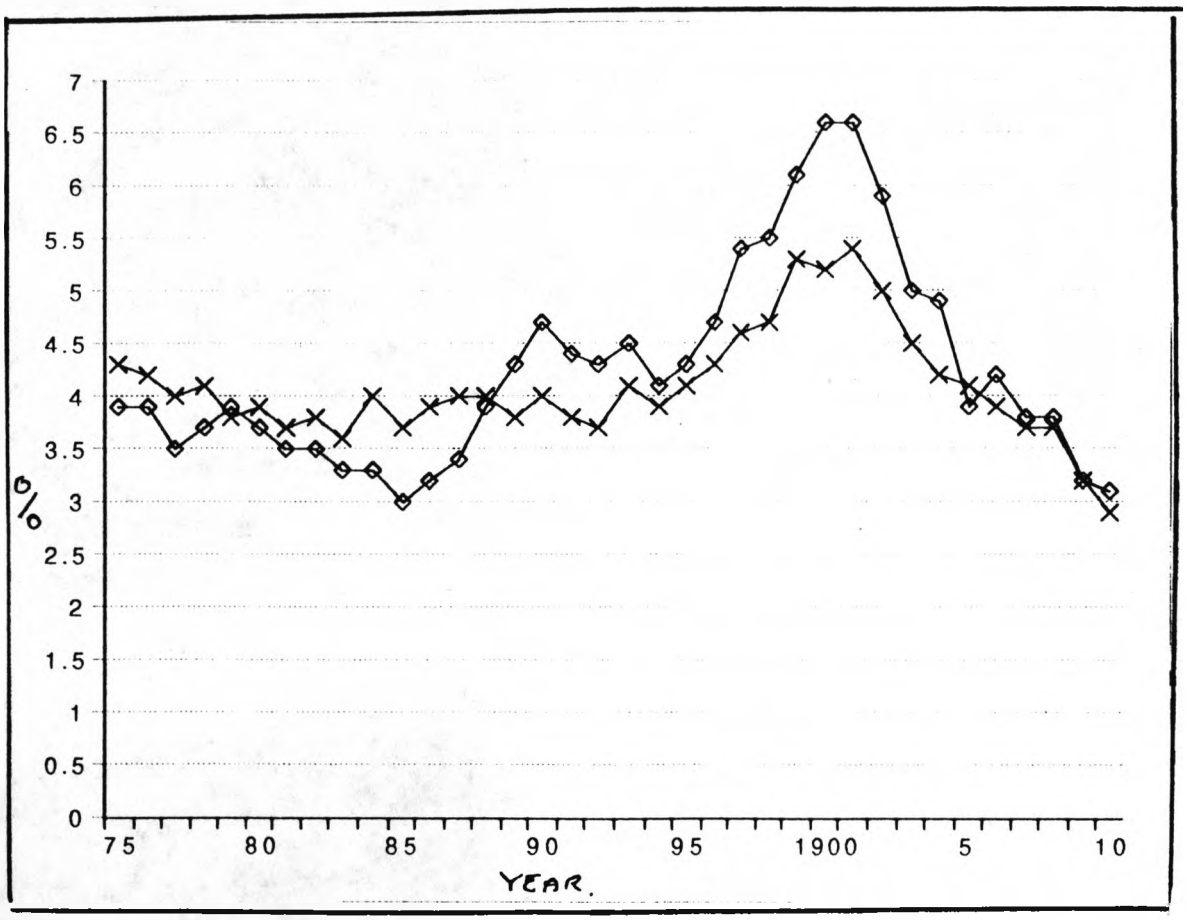
Second quarter infant deaths as a percentage of live births as a five year moving average from 1871 to 1910 for Nuneaton and for England



◇....Nuneaton X.....England

Graph 4

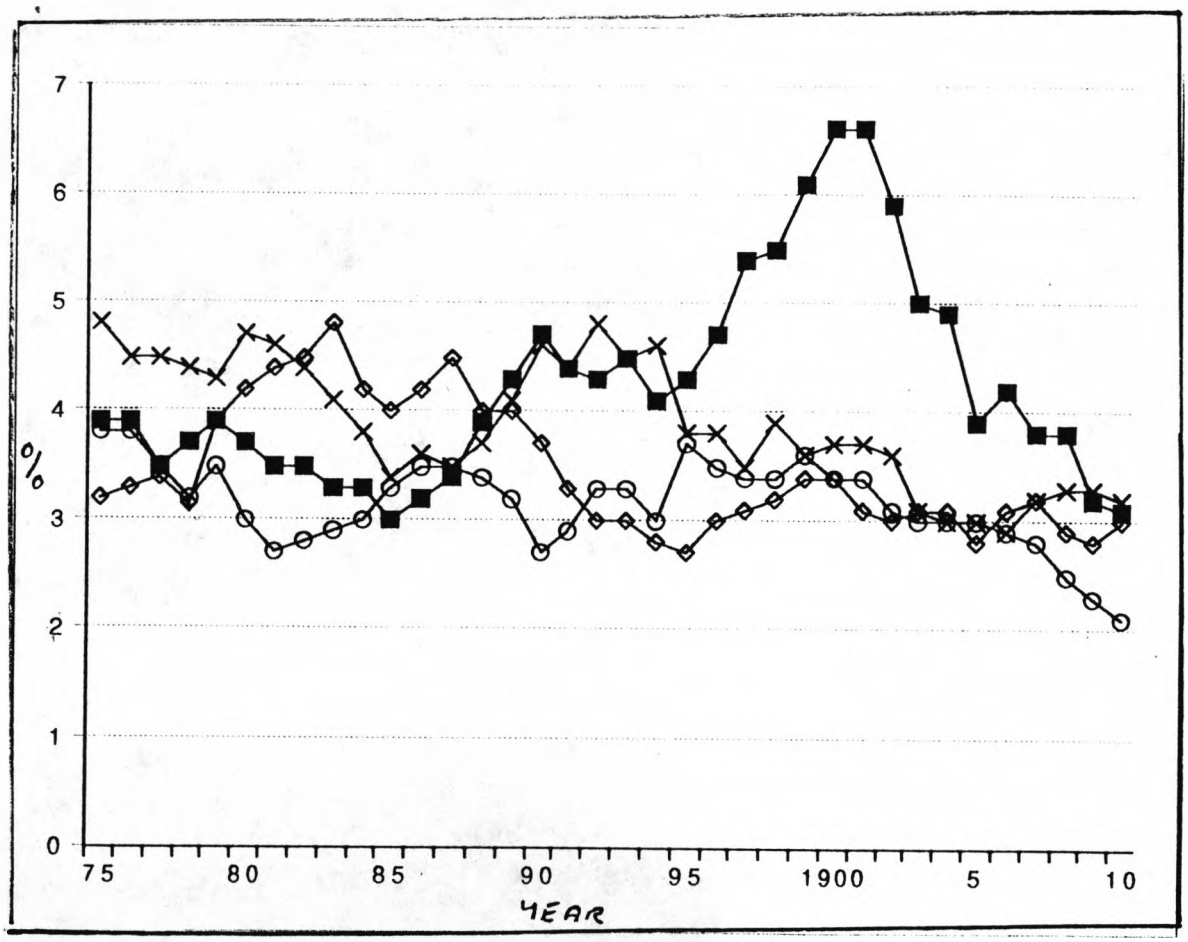
Third quarter infant deaths as a percentage of live births as a five year moving average from 1871 to 1910 for Nuneaton and for England



◇....Nuneaton X.....England

Graph 5

The four quarters of infant deaths for Nuneaton as a percentage of live births as a five year moving average from 1871 to 1910

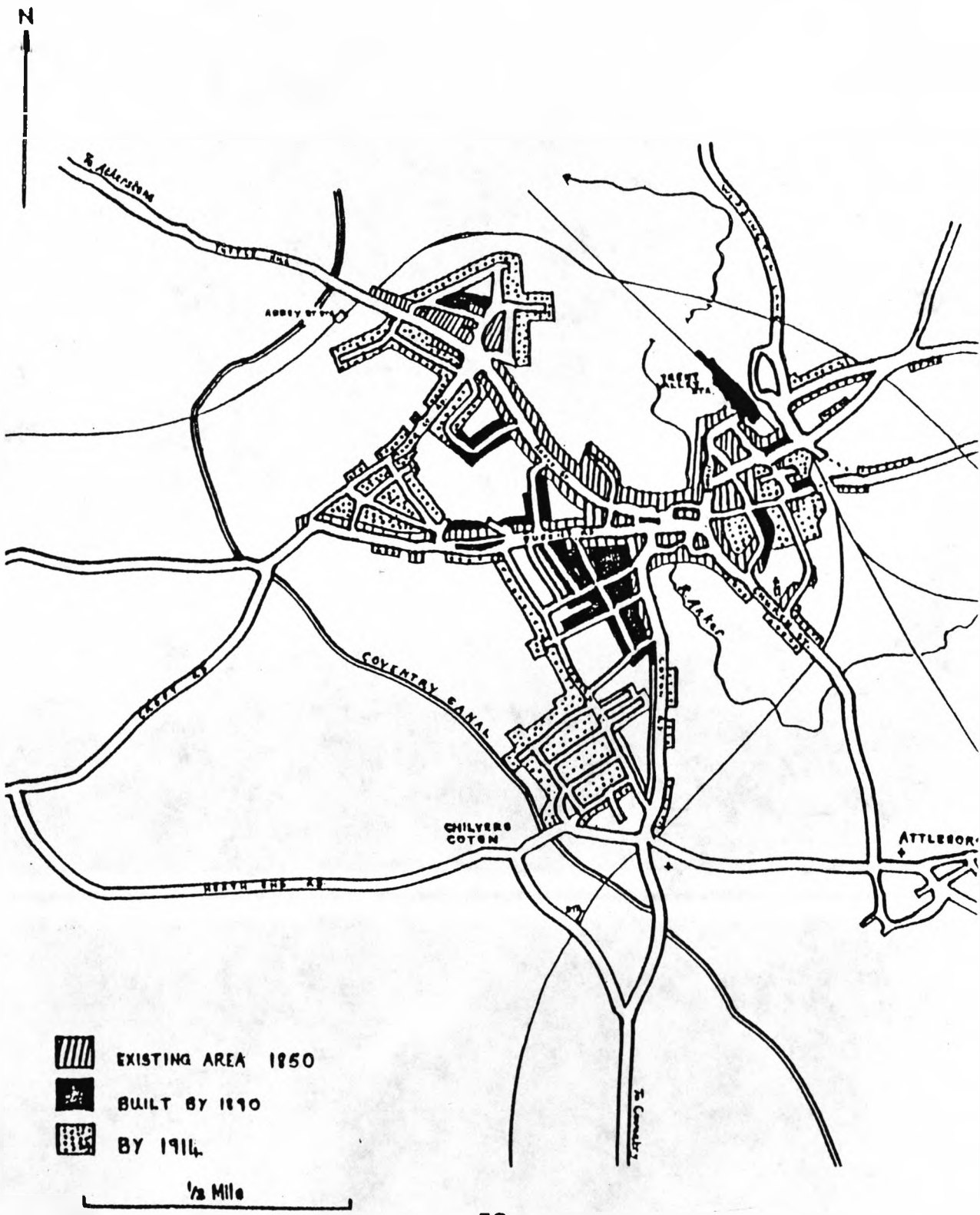


X.....First quarter O.....Second quarter

■....Third quarter ◇.....Fourth quarter

Appendix 2

Development in Nuneaton 1850 to 1914



Appendix 3

Families experiencing multiple infant deaths

1891 CEB.

No. 5, 7 Court, Abbey Street. 3 rooms (On the 1881 CEB living at 9 Court)

Isaac Bates	Head	34	Painter	Chilvers Coton
Emily Bates	Wife	35		Hartshill
Walter	Son	13	Painter	Nuneaton
Clara	Daughter	10		Nuneaton
Joseph	Son	7		Nuneaton
Edith	Daughter	3		Nuneaton

Pot Kiln, Heath End. 4 rooms

John Luckman	Head	43	Coal miner	Nuneaton
Sarah E. Luckman	Wife	38	Dress maker	Nuneaton
Mary	Daughter	14	Shoe heel hand	Nuneaton
Annie	Daughter	11	Scholar	Nuneaton
Frank	Son	9	Scholar	Nuneaton
Joseph	Son	2		Nuneaton

14, Abbey Street. (Previously in Queen Street, also given as Market Place)

Charles Hewitt	Head	36	Fishmonger	Wolston
Emma Hewitt	Wife	37		Wythall
Thomas	Son	15	Baker	Coventry
George	Son	13		Coventry
William	Son	10		Nuneaton
Joseph	Son	9		Nuneaton
Sarah Anne	Daughter	11		Nuneaton

Chancery Lane, Stockingford 4 rooms (Address sometimes given as Chapel End. Chancery Lane is in the Chapel End area of Stockingford)

William Suffolk	widower	Head	43	Coal miner	Hartshill
Jessie		Daughter	18		Hartshill
William		Son	17	Coal miner	
Stockingford					
Richard		Son	14		
Stockingford					
Thomas		Son	10		
Stockingford					

6, Albion Terrace, Attleborough 4 rooms

John Farr	Head	44	Engine Driver	Nuneaton
Maria Farr	Wife	38	Ribbon weaver	Chilvers Coton
Ellen	Daughter	14		Attleborough
Mary	Daughter	11		Attleborough

3, Stratford Street

Charles Payne	Head	41	General Dealer	Attleborough
Eliza Payne	Wife	42		Nuneaton
Sarah A.	Daughter	20	Shop Assistant	Nuneaton
William E.	Son	16	Bakers Assistant	Nuneaton
Edith M.	Daughter	7	Scholar	Nuneaton

110, Abbey Street.

Joseph Smith	Head	49	Coal dealer	Nuneaton
Harriet Smith	Wife	48		Nuneaton
Emma	Daughter	18	Wool worker	Nuneaton
George	Son	15	Carter	Nuneaton
Joseph	Son	12		Nuneaton
William	Son	11		Nuneaton
George Brown	Lodger	19	Coal Miner	Found in London

Horse Shoe Yard, Heath End, Chilvers Coton. 3 rooms

Jonathan Hall	Head	32	Coal miner	Chilvers Coton
Mary Hall	Wife	33		Bedworth

Leicester Street, Bulkington.

John Oliver Smith	Head		Boot & shoe maker	Bulkington
Agnes Smith	Wife	33	Postmistress	Bulkington

Weavers Arms, Bulkington.

David Whetstone	Head	40	Publican / labourer	Ryton
Eliza Whetstone	Wife	38		Foleshill
Joseph	Son	11		Ryton
William	Son	2		Ryton

Severn Cottage, Hinckley Road.

Robert George Blofeld	Head	50	Supervisor in Inland Revenue	Exeter
Fanny Bruce Blofeld	Wife	41		Lydney, Glos.
Alice Elizabeth	Daughter	17		Devon
Mildred Mary Bruce	Daughter	16		Cornwall
Noah Frances	Daughter	15		Reading
Margaret Mary	Daughter	8		Nuneaton
Donald Henry	Son	4		Nuneaton

Morristown Lane, Abbey Green.

William Thompson	Head	50	Labourer	Attleborough
Sarah Thompson	Wife	46		Nuneaton
William Henry	Son	24	Wool labourer	Nuneaton
Charles James	Son	17	Wool labourer	Nuneaton
Sarah	Daughter	15	Silk weaver	Nuneaton
Eunice Edith	Daughter	8	Scholar	Nuneaton
Laura Anne	Daughter	6	Scholar	Nuneaton
Ida Annie	Daughter	4	Scholar	Nuneaton
George Payne	Lodger	23	Wool labourer	Stockingford
Elizabeth Payne	Lodgers wife	22	Silk weaver	Nuneaton
William Taylor		68	no occupation	Nuneaton
David Taylor Thompson	Son	12	Scholar	Nuneaton

1881 CEB

Bramcote Fields, Bulkington

Isaac Perkins	Head	43	Farmer (123 acres, employing 2 men)	
Jane Perkins	Wife	31		Nuneaton
William	Son	10	Scholar	Bulkington
Richard	Son	8	Scholar	Bulkington
Sarah	Daughter	6	Scholar	Bulkington
Fanny	Daughter	4		Bulkington
Ann	Daughter	3		Bulkington
John	Son	2		Bulkington
George	Son	11 months		Bulkington
Mary Airedale	wid. Mother	65		
Hannah Argyle	servant	15		Chilvers Coton

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25 Court, Abbey Street.

William Ash	Head	32	Engine stoker at hat factory	Nuneaton
Hannah Ash	Wife	27		Chilvers Colon
Arthur James	Son	10	Scholar	Nuneaton
Margaret	Daughter	8	Scholar	Nuneaton
Charles	Son	1		Nuneaton
Amy	Daughter	4		Nuneaton
Ellen Jane	Daughter	2		Nuneaton

Appendix 4. Children numbered by position in family

Family no.	1	2	3	4	5	6	7	8	9	10
1	L	L	D	L	L	D	D	D		
2	L	L	L	D	D	D	L	D		
3	L	L	L	L	D	D	L	D	D	
4	L	L	L	L	D	D	D	D		
5	L	L	D	D	D					
6	L	L	D	L	D	D				
7	L	L	L	L	D	D	D			
8	D	D	D							
9	D	D	D							
10	L	D	D	D	L					
11	L	L	L	L	L	D	D	D		
12	L	L	L	D	D	L	D	L		
13	L	L	L	L	L	L	L	D	D	D
14	L	L	L	L	L	D	D	D		
% survived	86	79	76	57	66	50	20	33	0	0

L = lived D = died

References:-

Warwick County Record Office:-

CEB Nuneaton 1881 RG 11 / 3060

1891 RG 12 / 2445

Nuneaton Union Vaccination Registers 1871 (CR 51 / 404 and 405)

1893 (CR 51 / 426)

1906 (CR 51 / 439)

Nuneaton Union Registrar`s return of deaths of infants to vaccination officer

1881 to 1891 inclusive (CR 51/ 413 to CR 51/ 424)

1893 (CR 51 / 480)

1906 (CR 51 / 493)

Nuneaton Chronicle 1871 - 1890 (M1 356 / 1 - 28)

1920 (Jan 16th)

Annual Report of the Nuneaton Local Board of Health 1911

Beaver, M.W. (1973)`Population, urban mortality and milk`. *Population Studies*, 27. pp 243 - 54. (pp 244, 245)

Clark. G.T. (1849) `Report to the General Board of Health on a preliminary inquiry into the sewerage, drainage and supply of water and the sanitary condition of the inhabitants of the parishes of Nuneaton and Chilvers Coton` HMSO. London

Dwork, D. (1987) `The milk option. An aspect of the history of the infant welfare movement in England 1898 - 1908`. *Medical History* . 31. pp 51 - 69 (1987)(pp.55 & 57)

Dyehouse, C. (1978) `Working class mothers and infant mortality in England 1895 - 1914`. *The Journal of Social History.* 12. pp 248 - 267. (1978)(pp 248,

251-2)

Garrett, E. and Reid, A. (1995) `Thinking of England and taking care: family building strategies and infant mortality in England and Wales, 1891 - 1911`. *International Journal of Population Geography*, 1. pp 69 - 102. (p 70, 75-78)

Horne, R.H.(1842) `Childrens` employment commission: Report on employment of children and young persons in the iron trade and other manufactures in South Staffordshire.`

Johnstone, R.W. (1900) `Report to the Local Government Board upon epidemic enteric fever in Nuneaton and Chilvers Colon Urban District`. HMSO. London

Lane, I. `Warwickshire local history sources`.(p.71-72)

Lee, C.H. (1991) `Regional inequalities in infant mortality in Britain, 1861 - 1971: patterns and hypotheses`. *Population Studies*. 45. pp55 - 65 (1991)(p.56)

Levine, P.(1987) `Victorian Feminism, 1850 - 1900`. London. Hutchison Education.

Lewis, J. (1980) `The social history of social policy: infant welfare in Edwardian England`. *Journal of Social Policy*. 9.pp.463 - 486. (p465-468)

Milburn, D. (1963) `Nuneaton : the growth of a town`. Nuneaton Corporation, Library and Museum Committee.

Nuneaton Local Board of Health Minutes, 1897.

Procter, R.J. (1995) `To what extent did married women form part of the labour force in the second half of the nineteenth century, with particular reference to Redditch and Bromsgrove`. Open University, unpublished project DA 301.

Spring Rice, M. (1939) `Working class wives, their health and conditions`. London. Virago.(p.55)

Szreter, I.S. (1988) `The Importance of social intervention in Britain`s mortality

decline c. 1850 - 1914: a re-interpretation of the role of public health`. *Social history of Medicine.* 1 pp 1 - 37 (1988)(p2-5)

Townsend, P. and Davidson, N. (eds) (1982) `Inequalities in health: the Black Report`. Harmondsworth. Penguin.

Williams N. and Galley C. (1995) ` Urban-rural differentials in infant mortality in Victorian England`. *Population Studies*, 49.pp.401 - 420. (p 403, 411, 417, 419.)

Woods, R.I., Watterson, P.A., and Woodward, J.H. (1989) ` The causes of rapid infant mortality decline in England and Wales, 1861 - 1921. Part II`. *Population Studies.* 43. pp 113 - 130. (1989) (pp 113, 117)

Woods, R. (1985) `The effects of population redistribution on the level of mortality in nineteenth century England and Wales`. *Journal of Economic History.*, 45.pp645 - 651.(p649)

Private Papers:-

Williams, D. Papers re cottages in Wheat St (CR 3021 / 1 - 6)